

**Army Regulation 40-25
BUMEDINST 10110.6
AFI 44-141**

Medical Services

Nutrition Standards and Education

**Headquarters
Departments of the Army, Navy, and Air
Force
Washington, DC
15 June 2001**

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SUMMARY of CHANGE

AR 40-25/BUMEDINST 10110.6/AFI 44-141

Nutrition Standards and Education

This revision--

- o Renames the recommended nutrient standards, changing the term from Military Recommended Dietary Allowances to Military Dietary Reference Intakes (para 2-1).
- o Updates the Military Dietary Reference Intakes and nutrient standards for operational and restricted rations to incorporate the Food and Nutrition Board's Recommended Dietary Allowances, tenth revised edition, 1989; the Food and Nutrition Board's Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride, 1997; the Food and Nutrition Board's Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline, 2000; and the Food and Nutrition Board's Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids, 2000 (tables 2-1 and 2-2).
- o Expands information on survival rations to provide information on the Food Packet, Survival, General Purpose, Improved; the Food Packet, Survival, Abandon Ship; and the Food Packet, Survival, Aircraft/Life Raft (para 2-2e).
- o Updates information on energy expenditures under various environmental conditions, such as cold, hot, or high altitude environments, to include data from recent studies (para 2-3).
- o Deletes the majority of the previous nutrient discussion. This information is now included in USARIEM Technical Note 00/10: Military Dietary Reference Intakes: Rationale for Tabled Values.
- o Establishes that the services are responsible for meeting the guidelines of AR 40-25/BUMEDINST 10110.6/AFI 44-141 in their food service programs.
- o Deletes the nutrient density index and allows the services to determine their own standards for meeting the requirements outlined in AR 40-25/BUMEDINST 10110.6/AFI 44-141.
- o Replaces AF Regulation 160-95.

Headquarters
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*Army Regulation 40-25
*BUMEDINST 10110.6
*AFI 44-141

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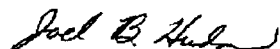
Medical Services

Nutrition Standards and Education

By Order of the Secretary of the Army:

ERIC K. SHINSEKI
*General, United States Army
Chief of Staff*

Official:



JOEL B. HUDSON
*Administrative Assistant to the
Secretary of the Army*

By Order of the Secretary of the Navy:

R. A. NELSON
*Vice Admiral, Medical Corps,
United States Navy
Chief, Bureau of Medicine and Surgery*

By Order of the Secretary of the Air Force:

CHARLES H. ROADMAN, II
*Lieutenant General, Medical Corps,
United States Air Force
Surgeon General*

History. This printing publishes a revision of AR 40-25 / NAVMEDCOMINST 10110.1/AFR 160-95. Because the publication has been extensively revised, the changed portions have not been highlighted.

Summary. This joint regulation has been revised. It defines the nutrition responsibilities of the Surgeons General of the Army, the Navy, and the Air Force. It also updates information on nutrient standards, information, and education.

Applicability. This regulation applies to the active and reserve components of the Army, Air Force, Navy, and Marine Corps; the Air National Guard; and the Army National Guard. This publication is not applicable during mobilization.

Proponent and exception authority. The proponent of this regulation is the Army Surgeon General. The proponent has the authority to approve exceptions to this regulation that are consistent with controlling law and regulation. Proponents

may delegate this approval authority, in writing, to a division chief within the proponent agency that holds the grade of colonel or the civilian equivalent.

Army management control process. This regulation contains management control provisions, but does not identify key management controls that must be evaluated.

Supplementation. Supplementation of and exceptions to this regulation are prohibited without prior approval from HQDA (DASG-HSZ), 5109 Leesburg Pike, Falls Church, VA 22041-3258; Department of the Navy, Bureau of Medicine and Surgery, Washington, DC 20372-5300; or HQ USAF/SGB, Bolling Air Force Base, Washington, DC 20332-6188, for each respective Service.

Suggested Improvements. Army users are invited to send comments and suggested improvements on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to HQDA

(DASG-HSZ), 5109 Leesburg Pike, Falls Church, VA 22041-3258.

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*This publication supersedes AR 40-25/NAVMEDCOMINST 10110.1/AFR 160-95, 15 May 1985.

Contents (Listed by paragraph and page number)

Chapter 1

Introduction, *page 1*

Purpose • 1–1, *page 1*

References • 1–2, *page 1*

Explanation of abbreviations and terms • 1–3, *page 1*

Responsibilities • 1–4, *page 1*

Chapter 2

Nutritional Standards, *page 2*

Nutritional standards for military feeding • 2–1, *page 2*

Nutritional standards for operational and restricted rations • 2–2, *page 3*

Energy requirements • 2–3, *page 4*

Macronutrients • 2–4, *page 4*

Water, sodium, and carbohydrate-electrolyte beverages • 2–5, *page 4*

Reduced calorie menus • 2–6, *page 5*

Chapter 3

Nutrition Education, *page 8*

Policy • 3–1, *page 8*

Nutrition education personnel • 3–2, *page 8*

Appendix A. References, *page 9*

Table List

Table 2–1: Military Dietary Reference Intakes (MDRIs)¹ per day, *page 5*

Table 2–2: Nutritional Standards for Operational and Restricted Rations (NSOR)¹, *page 7*

Table 2–3: Criteria for carbohydrate-electrolyte beverages, *page 8*

Glossary

Index

Chapter 1

Introduction

1–1. Purpose

This regulation establishes nutritional standards, termed “military dietary reference intakes” (MDRIs), for military feeding and establishes nutritional standards for operational rations (NSOR). It covers responsibilities of the services’ Surgeons General and the services’ food service programs. It identifies the effects of environmental factors on energy and nutrient requirements and outlines nutrition education policy. The nutrition standards apply to the services’ hospital food service programs, the services’ food service programs, and the DOD Combat Feeding Program. Compliance with this regulation is required for all food service operations, whether provided by government sources or through contractor support. The nutrition education policy applies to the services’ medical, personnel and logistics communities.

1–2. References

Required and related publications and prescribed and referenced forms are listed in appendix A.

1–3. Explanation of abbreviations and terms

Abbreviations and special terms used in this regulation are explained in the glossary.

1–4. Responsibilities

a. The Surgeon General, United States Army (USA), exercises DOD responsibility for Nutritional Standards and Education and will—

- (1) Establish nutritional standards for meals served to military personnel subsisting under normal operating conditions and while under simulated or actual combat conditions (table 2-1 located at the end of chapter 2).
- (2) Establish nutritional standards for operational rations and restricted rations (table 2-2 located at the end of chapter 2).
- (3) Adjust nutritional standards as additional scientific information on nutrient needs becomes available and as the Food and Nutrition Board (FNB) or other nutrition policy agencies adopt new recommendations.
- (4) Evaluate and approve current and proposed operational rations, and recommend adjustments and other actions to ensure that the nutrient composition of the rations as offered for consumption meets the nutritional requirements of personnel in all operational environments.
- (5) Collaborate with the Services in the development of their nutrition education programs.
- (6) Maintain, through the U.S. Army Medical Research and Materiel Command, a military nutrition research capability to support further development and evaluation of nutritional requirements for operational conditions, to include operations at altitude and under extreme climatic conditions.
- (7) Conduct periodic assessments of military personnel on nutrient and fluid consumption patterns.

b. The Surgeons General of the Army, Navy, and Air Force will—

- (1) Review requests and make appropriate recommendations for deviations from established nutritional standards.
- (2) Develop and implement programs in line with the U.S. dietary recommendations, in support of a healthy and fit force, to—
 - (a) Influence food preferences to ensure mission needs are met without sacrificing morale.
 - (b) Educate commanders, soldiers and families, and food service staffs about mission specific nutrient requirements and strategies that will ensure eating habits will not adversely affect mission accomplishment.
 - (c) Discourage the use of unproven nutritional remedies, body building drugs, fad diets and supplements.
 - (d) Meet scientifically based weight control and physical fitness principles.
- (3) Provide qualified representatives to—
 - (a) Advise the Services’ health promotion, food service, weight control and physical fitness program proponents on matters that affect the nutritional aspects of these programs.
 - (b) Advise commanders and local food service organizations on matters that affect the nutritional aspects of the installation/shipboard health promotion, food service, weight control, and physical fitness programs.
 - (c) Advise joint forums that focus on matters that affect nutrition standards, nutrition education and nutritional aspects of the Services’ health promotion, food service, weight control and physical fitness programs.
- (4) Provide nutrition information and education to health care providers.
- (5) Establish and implement mechanisms to ensure hospital menus meet nutritional standards.
- (6) Establish policy to ensure that adjustments to planned hospital menus will meet nutritional standards.
- (7) Ensure healthy foods are incorporated into menu planning, meal preparation, and serving strategies in hospital menus.
- (8) Ensure that contract statements of work for food service operations clearly describe the contractor’s requirement to comply with applicable nutritional standards.

(9) Assist in providing food service personnel with knowledge and skills necessary for menu planning and food preparation that will maximize the nutritional value of foods.

c. The Deputy Chief of Staff for Logistics (DCSLOG), USA, will—

(1) Evaluate planned menus for compliance with the principles of Food Guide Pyramid and Dietary Guidelines for Americans.

(2) Establish policy to ensure that adjustments to planned menus will meet nutritional standards.

(3) Ensure healthy foods are incorporated into menu planning, meal preparation, and serving strategies.

(4) Ensure curriculum for the military food service occupational specialty incorporates principles of healthful menu planning, selection of healthy ingredients and assessment of menus for nutritional adequacy.

(5) Ensure that contract statements of work for food service operations clearly describe the contractor's requirement to comply with applicable nutritional standards.

(6) Provide qualified representatives to advise joint forums that focus on matters that affect the nutritional quality of the military feeding programs, nutrition standards and nutrition education.

d. The Commander, Naval Supply Systems Command, United States Navy (USN), will—

(1) Establish and implement mechanisms to ensure menus meet nutritional standards.

(2) Establish policy to ensure that adjustments to planned menus will meet nutritional standards.

(3) Ensure the incorporation of healthy foods in food programs.

(4) Ensure that healthy foods are appealing and convenient.

(5) Facilitate access to healthy foods at reasonable prices whenever possible.

(6) Provide food service personnel with knowledge and skills necessary for menu planning and food preparation that will maximize the nutritional value of foods.

(7) Ensure that contract statements of work for food service operations clearly describe the contractor's requirement to comply with applicable nutritional standards.

(8) Provide qualified representatives to advise joint forums that focus on matters that affect the nutritional quality of the military feeding programs, nutrition standards and nutrition education.

e. The Commander, Air Force Services Agency will—

(1) Establish and implement mechanisms to ensure menus meet nutritional standards.

(2) Establish policy to ensure that adjustments to planned menus will meet nutritional standards.

(3) Ensure the incorporation of healthy foods in food programs.

(4) Ensure that healthy foods are appealing and convenient.

(5) Facilitate access to healthy foods at reasonable prices whenever possible.

(6) Provide food service personnel with knowledge and skills necessary for menu planning and food preparation that will maximize the nutritional value of foods.

(7) Ensure that contract statements of work for food service operations clearly describe the contractor's requirement to comply with applicable nutritional standards.

(8) Provide qualified representatives to advise joint forums that focus on matters that affect the nutritional quality of the military feeding programs, nutrition standards and nutrition education.

f. The Deputy Chief of Staff for Installations and Logistics (DCSI&L), United States Marine Corps (USMC) will—

(1) Establish and implement mechanisms to ensure menus meet nutritional standards.

(2) Establish policy to ensure that adjustments to planned menus will meet nutritional standards.

(3) Ensure the incorporation of healthy foods in food programs.

(4) Ensure that healthy foods are appealing and convenient.

(5) Facilitate access to healthy foods at reasonable prices whenever possible.

(6) Provide food service personnel with knowledge and skills necessary for menu planning and food preparation that will maximize the nutritional value of foods.

(7) Ensure that contract statements of work for food service operations clearly describe the contractor's requirement to comply with applicable nutritional standards.

(8) Provide qualified representatives to advise joint forums that focus on matters that affect the nutritional quality of the military feeding programs, nutrition standards and nutrition education.

Chapter 2

Nutritional Standards

2-1. Nutritional standards for military feeding

a. The current MDRIs are adapted from the FNB's *Recommended Dietary Allowances*, tenth revised edition, 1989, except as updated by the FNB's *Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and*

Fluoride, 1997; the FNB's *Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline*, 2000; and the FNB's *Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids*, 2000. The MDRI is identical to recommended nutrient intakes cited in the above references, except when known differences in the military population requires adjustment of a particular nutrient. Table 2-1 lists the MDRI. The Surgeon General (TSG), Department of the Army (DA), will review the MDRI with each DRI update published, and make necessary changes to this regulation. United States Army Research Institute of Environmental Medicine (USARIEM) Technical Note TN-00/10 documents the basis for the MDRI.

b. The MDRI is intended for use by personnel involved in menu development, menu evaluation, nutrition education, nutrition research, and food research and development. When the MDRI is met through diets formed of a variety of foods from diverse food groups, such diets will likely be adequate in all other nutrients for which neither Dietary Reference Intakes (DRIs) nor MDRI is currently established. The MDRI is a quantitative estimate of nutrient intakes to be used for planning and assessing diets for the healthy military population.

c. The MDRI does not reflect the nutritional needs of pregnant or lactating military women nor of those individuals requiring medical nutrition therapy for conditions such as illness, injury, infection, chronic disease, and trauma. These individuals require assessment of nutritional needs by qualified medical professionals.

d. Certain conditions have special nutrition requirements not covered in this regulation (for example, when military members operate in protective clothing for prolonged periods of time). These conditions require consultation with TSG of the appropriate service(s).

e. Not all nutrients have an established recommended dietary allowance (RDA) or DRI. Usually, no MDRI is established if there is no RDA or DRI for a given nutrient. Exceptions will be approved by TSG, DA. Two approved exceptions in this regulation are for potassium and sodium.

f. The DOD installation and hospital dining facilities should serve as models to help military members, family members, and DOD employees meet recommended nutritional guidelines. Menu design will incorporate principles of the Dietary Guidelines for Americans (U.S. Departments of Agriculture and Health and Human Services) and the Food Guide Pyramid (U.S. Department of Agriculture). The MDRI will be met, when averaged, over a 5- to 10-day period. The MDRI will be compared with the calculated nutrient content of edible portions of food as offered for consumption. The most recent release of the United States Department of Agriculture Nutrient Database for Standard Reference will be used as the standard reference for nutrient composition.

g. The energy allowances shown in table 2-1 represent the average energy needs among individuals at various activity levels. These energy allowances are designed to maintain desirable body weights for healthy military members under varying levels of physical activity in a temperate environment. The MDRI is subject to adjustments as outlined in paragraph 2-3 below.

2-2. Nutritional standards for operational and restricted rations

Operational and restricted rations are designed for military personnel in a wide variety of operations, in widely varied settings, for limited time periods. They provide the entire diet for military personnel during sustained operations. The NSOR is based on the MDRI and is designed to support the special nutritional requirements for various actual or simulated combat situations. Personnel involved in operational ration development will use these standards in the development, procurement, and evaluation of operational and restricted rations. Table 2-2 prescribes the NSOR.

a. Operational rations include the individual ration (Meal, Ready-to-Eat (MRE)) and group feeding rations (T-ration, Unitized B ration, and Unitized Group Rations (UGR-A and UGR-H&S (heat and serve))), and are designed to be nutritionally adequate. Operational ration menus will be designed so the menus, when averaged, meet the NSOR. The calculated or assayed nutrient content of edible portions of food as offered for consumption will be compared to the NSOR. Total calories from fat should not exceed 35 percent of calories for these rations.

b. The MRE may be consumed as the sole ration for up to 21 days. After 21 days, other appropriate rations (for example, the UGR-A, UGR-H&S) will be included in the daily mix of rations. This policy is based on extensive biochemical evaluations of soldiers consuming MREs for 30 days during field training. No degradation of performance or nutritional deficit was found before 21 days. When the MRE is the sole ration, units will provide supplements and enhancements (for example, bread, milk, and fresh fruit) whenever feasible.

c. Some operational rations are designed for special situations. These rations provide for the increased nutritional requirements imposed by exposure to an extreme environment. This includes the Meal, Cold Weather.

d. The nutritional standards for operational rations do not apply to restricted rations. Restricted rations are nutritionally incomplete rations used in certain operational scenarios, such as long-range patrol and reconnaissance, when troops are required to subsist for short periods (up to 10 days) carrying minimal weight. Restricted rations include the Food Packet, Long-Range Patrol ration. Nutritional standards for restricted rations are outlined in table 2-2.

e. The NSOR does not apply to survival rations. Survival rations include the Food Packet, Survival, General Purpose, Improved (GP-I) ration; the Food Packet, Survival, Abandon Ship ration; and the Food Packet, Survival, Aircraft/Life Raft ration. The GP-I contains 1447 calories. The Food Packet, Survival, Abandon Ship ration and the Food Packet, Survival, Aircraft/Life Raft ration both contain approximately 300 calories, and are strictly short-term survival rations.

f. Basic nutrient information on all rations is available in NATICK PAM 30-25, Operational Rations of the Department of Defense.

2-3. Energy requirements

a. *MDRI calculation.* The MDRI for energy are calculated to represent the average needs of individuals with reference body heights and weights. These reference measures of height and weight represent the 50th percentile of military men and women.

b. *Body size.* Reference measures for weight and height of military members are 174 pounds (79 kilograms (kg)) and 69 inches (175 centimeters (cm)) for men, and 136 pounds (62 kg) and 64 inches (163 cm) for women. Larger individuals will have slightly higher average energy needs. Smaller individuals will require fewer calories than the MDRI for energy.

c. *Physical activity.* Physical activity affects energy needs. Military personnel doing heavy work or involved in prolonged, vigorous physical training may have energy requirements that exceed 125 percent of the MDRI for energy (for example, 4000 to 5000 calories/day).

d. *Environmental factors.* The MDRI for energy are established for personnel working in a temperate climate. Prolonged exposure to environmental extremes such as cold or heat may affect energy needs; therefore, energy needs may need to be adjusted for these conditions.

(1) *Cold environment.* Work in severe cold may result in very high energy requirements. Even mildly cold temperatures (32 to 57 degrees F) can increase energy requirements 5 to 10 percent. Individual energy requirements will depend on body size, clothing, and activity level. When ambient temperatures warrant high levels of cold-weather protection (for example, the Extreme Cold Weather Clothing System and the Vapor Barrier boot), energy requirements may increase to approximately 54 calories/kg body weight. Energy needs are higher (approximately 62 calories/kg body weight) when troops maneuver for prolonged periods (2 hours or more) with heavy gear on their feet (for example, snowshoes and skis) over snow- or ice-covered terrain. These increased energy requirements do not apply to troops located in cold climates with limited exposure to outdoor temperatures.

(2) *Hot environment.* No adjustment to energy requirements appears to be necessary for environmental temperatures between 68 and 86 degrees F. For temperatures in the 86 to 104 degree F range, energy requirements may increase 2.5 to 10 percent. Although the energy needed to perform specific tasks is higher in the heat than in neutral temperatures, because of the tendency (and need) to rest more in hot environments, 24-hour energy needs may not increase. In addition, heat-acclimated individuals likely will not have an increase in energy requirements.

(3) *Altitude.* Energy requirements for high-altitude operations, altitudes greater than 10,000 feet (3050 meters), are substantially increased. Energy requirements of individuals performing extremely strenuous work in high-mountain areas may reach 6,000 to 7,000 calories a day. Individual energy requirements will depend on body size, weight of load carried, the level of incline, walking surface features, and the ambient temperature. For moderate activity, energy needs are estimated at 50 to 55 calories/kg body weights. For prolonged periods of work in full cold-weather gear, energy needs may reach 60 calories/kg body weight. The loss of appetite that occurs at high altitude, coupled with these increased needs, makes obtaining sufficient energy to maintain lean body mass very difficult without conscious effort. Therefore, such conditions may require a disciplined food and water intake program.

2-4. Macronutrients

For a full discussion of all nutrients listed in table 2-1, refer to USARIEM Technical Note TN-00/10.

a. *Carbohydrate.* Approximately 50 to 55 percent of total calories consumed should come from foods and beverages with carbohydrate sources.

b. *Protein.* The MDRI for protein (table 2-1) are based on levels established in the RDAs and on requirements during periods of intense physical activity; they range from 0.8 to 1.5 gram (g) protein per kg body weight. Application of these standards to the reference measures for military men and women equates to a protein range intake of 63 to 119 g/day for men and 50 to 93 g/day for women. The MDRI for protein is easily met when protein intake comprises 10 to 15 percent of total energy, and energy intake is adequate.

c. *Fat.* In military dining facilities, menu planners will establish menus with 30 percent or less of total calories from fat. Saturated fat should be limited to 10 percent of total calories and cholesterol should be limited to no more than 300 milligrams (mg)/day. However, with operational and restricted rations, a higher fat ration may be necessary to increase caloric density and minimize ration weight. Such rations will be approved by TSG, DA.

2-5. Water, sodium, and carbohydrate-electrolyte beverages

a. Individuals must avoid dehydration to maintain optimum performance. Cool water (plain or flavored) is the beverage of choice for preventing dehydration, except for conditions outlined in f below. Flavored waters may increase voluntary fluid consumption.

b. Fluid requirements increase as work intensity increases and as sweat is produced. During periods of light to moderate activity in a temperate climate, an intake of 1 quart of beverage per 1,000 calories expended is a reasonable goal. With greater work intensity and sweat rates, water requirements increase.

c. Physical activity in hot environments can lead to severe dehydration. Water requirements in hot environments depend on the amount of fluid loss due to sweating. Recommend troops consume approximately 4 to 6 quarts of beverage per day when working in warm weather. More fluids are needed as physical work and temperatures increase, and as sweating rates increase. Personnel wearing nuclear, biological, chemical clothing routinely produce 1 to 2 quarts of sweat per hour. Even the most rigorously enforced drinking schedule may fail to match water losses. Therefore, work schedules and other factors that affect heat gain and sweat losses must be carefully managed. Army policy is further outlined in FM 21-10 and TB MED 507.

d. Working at high altitude increases water needs to approximately 4 to 6 quarts per day. During the first few days of exposure to high altitude, recommend a daily supplement of 2 to 3 quarts beverage that contains 50 to 100 g carbohydrate/quart to minimize hypohydration and altitude sickness. After the first few days, carbohydrate content of beverage supplement may increase to 100 to 125 g carbohydrate/quart.

e. Hard physical work in a hot environment increases the amount of sodium lost in sweat. The need for extra salt (a source of sodium) depends on the severity of sweat loss and the degree of acclimatization. When sodium replacement is required, it should be provided through food, beverages, and as added salt to foods. The use of salt tablets is not recommended.

f. Certain conditions justify the use of a carbohydrate-electrolyte beverage. These conditions include: when soldiers maintain continuous physical activity for periods beyond 3 hours; when soldiers have poor nutritional intake or sustain an energy deficit of 1,000 calories or more per day; or when sweat loss is high and electrolytes are not adequately replaced by diet. Army policy is further outlined in TB MED 507.

(1) The carbohydrate-electrolyte beverage should meet these criteria: Carbohydrate from sugars or starch in a concentration of 5 to 12 percent; and electrolytes provided as 10 to 30 milliequivalents (mEq) of sodium per liter and 2 to 5 mEq of potassium per liter. On product labels, these criteria translate as shown in table 2-3 located at the end of chapter 2.

(2) There are a variety of commercial carbohydrate-electrolyte beverages and beverage mixes currently available that meet these criteria. Beverages with higher concentrations of carbohydrate may be diluted with water to achieve a 5 to 12 percent concentration.

2-6. Reduced calorie menus

In support of military weight control programs, each military dining facility will offer reduced calorie menus, of 1,500 to 1,600 calories a day, reflecting the guidelines of the Food Guide Pyramid. Total fat should not exceed 30 percent of the energy value. Each meal should contain approximately 500 calories. Military dining facilities serving populations with high energy needs, such as initial entry trainees, will offer a menu containing 600 to 700 calories per meal (1,800 to 2,100 calories a day). Implementation procedures and exceptions to policy for reduced calorie menus will be prescribed by each military service.

Table 2-1
Military Dietary Reference Intakes (MDRIs)¹ per day

Nutrient	Unit	Men	Women
Energy ²	kcal/d	3250	2300
General/Routine:			
Light activity	kcal/d	3000	2200
Moderate activity	kcal/d	3250	2300
Heavy activity	kcal/d	3950	2700
Exceptionally-heavy activity	kcal/d	4600	3150
Protein ³	g/d	91 (63-119)	72 (50-93)
Vitamin A ⁴	µg RE/d	1000	800
Vitamin D ⁵	µg/d	5	5
Vitamin E ⁶	mg/d	15	15
Vitamin K	µg/d	80	65
Vitamin C	mg/d	90	75
Thiamin (B ₁)	mg/d	1.2	1.1
Riboflavin (B ₂)	mg/d	1.3	1.1
Niacin ⁷	mg NE/d	16	14

Table 2–1
Military Dietary Reference Intakes (MDRIs)¹ per day—Continued

Nutrient	Unit	Men	Women
Vitamin B ₆	mg/d	1.3	1.3
Folate ⁸	µg DFE/d	400	400
Vitamin B ₁₂	µg/d	2.4	2.4
Calcium ⁹	mg/d	1000	1000
Phosphorus ¹⁰	mg/d	700	700
Magnesium ¹¹	mg/d	420	320
Iron ¹²	mg/d	10	15
Zinc	mg/d	15	12
Sodium ¹³	mg/d	5000 (4550-5525)	3600 (3220-3910)
Iodine	µg/d	150	150
Selenium	µg/d	55	55
Fluoride ¹⁴	mg/d	4.0	3.1
Potassium ¹⁵	mg/d	3200	2500

Notes:

¹ Values for energy, protein, and associated nutrients are expressed as average daily nutrient intakes and based on moderate activity levels and reference body weights of 79 kg (174 lb) for military men and 62 kg (136 lb) for military women.

² Energy recommendations for various activity levels are estimates only and vary among individuals. The general values are for moderate levels of activity and are appropriate for most personnel in garrison. Values are rounded up to the nearest 50 kcal.

³ The initial values in the table represent the midpoints of the ranges calculated using military reference body weights and protein intake recommendations of 0.8 to 1.5 g per kg body weight.

⁴ The unit of measure is microgram retinol equivalent (µg RE). 1 µg RE=1 µg retinol or 6 µg β-carotene. 1 µg RE=10 International Units (IU) vitamin A if from β-carotene. 1 µg RE=3.33 IU vitamin A if from retinol.

⁵ As cholecalciferol. 1 µg cholecalciferol=40 IU vitamin D.

⁶ The unit of measure is milligram α-tocopherol that includes RRR-α-tocopherol, the only form of α-tocopherol that is found in food and the 2R-stereoisomeric forms that are found in fortified foods and dietary supplements. This does not include the 2S-stereoisomeric forms that are also found in fortified foods and dietary supplements.

⁷ The unit of measure is niacin equivalent (NE). 1 mg NE=1 mg niacin or 60 mg dietary tryptophan.

⁸ The unit of measure is dietary folate equivalent (DFE). 1 µg DFE=1 µg food folate, 0.5 µg synthetic folic acid taken on an empty stomach, or 0.6 µg synthetic folic acid taken with meals. Women capable of becoming pregnant should consume 400 µg of synthetic folic acid daily from fortified foods or supplements or a combination of both, in addition to food folate.

⁹ The MDRI for calcium will meet the needs of most personnel. However, personnel 17 to 18 years old have higher calcium needs not accounted for by this MDRI. A more appropriate dietary goal of personnel in this age group is 1300 mg/d. Special attention should be given to providing calcium-rich foods if serving meals to a group with a large proportion of military personnel younger than 19 years old.

¹⁰ The MDRI for phosphorus will meet the needs of most personnel. However, personnel 17 to 18 years have higher phosphorus needs not accounted for by this MDRI. A more appropriate dietary goal of personnel in this age group is 1250 mg/d. Special attention should be given to providing phosphorus-rich foods if serving meals to a group with a large proportion of military personnel younger than 19 years old.

¹¹ The MDRI for magnesium will meet the needs of most personnel. However, female personnel 17 to 18 years old have higher magnesium needs not accounted for by this MDRI. A more appropriate dietary goal of women in this age group is 360 mg/d. Special attention should be given to providing magnesium rich foods if serving meals to a group with a large proportion of female personnel younger than 19 years old.

¹² The MDRI for iron will meet the needs of most personnel. However, male personnel 17 to 18 years old have higher iron needs not accounted for by this MDRI. A more appropriate dietary goal of men in this age group is 12 mg/d. However, meals that meet the MDRI for women will adequately supply the extra iron needs of men 17 to 18 years old.

¹³ Sodium recommendations are based on 1400 to 1700 milligrams of sodium per 1000 kcal of food served. The initial values in the table represent the rounded midpoints of the ranges calculated using energy intakes for moderate activity of 3250 kcal for men and 2300 kcal for women.

¹⁴ The MDRI is based on a recommended daily intake of 0.05 mg/kg body weight.

¹⁵ The minimal requirement for potassium is approximately 1600 to 2000 mg/day. The MDRI is based on a recommended daily intake of 40 mg/kg body weight.

Table 2–2
Nutritional Standards for Operational and Restricted Rations (NSOR)¹

Nutrient	Unit	Operational Rations	Restricted Rations
Energy	kcal	3600	1500
Protein	g	91	50
Carbohydrate	g	494	200
Fat	g	2	2
Vitamin A ³	µg RE	1000	500
Vitamin D ⁴	µg	5	3
Vitamin E ⁵	mg	15	8
Vitamin K	µg	80	40
Vitamin C	mg	90	45
Thiamin (B ₁)	mg	1.2	0.6
Riboflavin (B ₂)	mg	1.3	0.7
Niacin ⁶	mg NE	16	8
Vitamin B ₆	mg	1.3	0.7
Folic Acid ⁷	µg DFE	400	200
Vitamin B ₁₂	µg	2.4	1.2
Calcium	mg	1000	500
Phosphorus	mg	700	350
Magnesium	mg	420	210
Iron	mg	15	8
Zinc	mg	15	8
Sodium ⁸	mg	5000-7000	2500-3500
Iodine	µg	150	75
Selenium	µg	55	28
Fluoride	mg	4.0	2.0
Potassium	mg	3200	2000

Notes:

¹ Values are minimum standards at the time of consumption, except for fat (which does not have an absolute standard value) and sodium (which presents minimum and maximum content levels). Nutritional standards for rations are based on the MDRIs established for healthy, active military personnel.

² Total energy from fat should not exceed 35% of total kcal.

³ The unit of measure is microgram retinol equivalent (µg RE). 1 µg RE=1 µg retinol or 6 µg β-carotene. 1 µg RE=10 International Units (IU) vitamin A if from β-carotene. 1 µg RE=3.33 IU vitamin A if from retinol.

⁴ As cholecalciferol. 1µg cholecalciferol=40 IU vitamin D.

⁵ The unit of measure is milligram α-tocopherol that includes RRR-α-tocopherol, the only form of α-tocopherol that is found in food and the 2R-stereoisomeric forms that are found in fortified foods and dietary supplements. This does not include the 2S-stereoisomeric forms that are also found in fortified foods and dietary supplements.

⁶ The unit of measure is niacin equivalent (NE). 1 mg NE=1 mg niacin or 60 mg dietary tryptophan.

⁷ The unit of measure is dietary folate equivalent (DFE). 1 µg DFE=1 µg food folate, 0.5 µg synthetic folic acid taken on an empty stomach, or 0.6 µg synthetic folic acid taken with meals.

⁸ These values do not include the salt packet. The sodium content of restricted rations may not be adequate for military personnel operating in hot environments, especially if they are not acclimatized. In these situations an electrolyte beverage may be indicated to provide additional electrolytes.

Table 2-3
Criteria for carbohydrate-electrolyte beverages

Ingredient	Amount per 8 ounces (as served)
Sodium	55-160 mg
Potassium	20-55 mg
Carbohydrate	11-19 gm

Chapter 3

Nutrition Education

3-1. Policy

a. All services will provide military members with a fundamental knowledge of nutrition to maximize performance, maintain long-term good health, and sustain morale. To provide a consistent message, nutrition education will incorporate the Food Guide Pyramid and the Dietary Guidelines for Americans (from the U.S. Departments of Agriculture and Health and Human Services). Further, educators will use effective education techniques, current nutrition knowledge, scientific research findings, and other appropriate information such as Healthy People 2010 (U.S. Department of Health and Human Services). Military food establishments will provide a variety of healthy food and beverage choices to all members to reinforce the nutrition message and maintain healthy eating habits.

b. In support of military weight control programs, the services will provide comprehensive weight management programs to train soldiers for effective weight management. At a minimum, these programs will include the following components: Assessing readiness for change, lifestyle changes (individualized), nutrition counseling, self-monitoring, behavioral training, physical activity and relapse prevention.

3-2. Nutrition education personnel

a. Registered dietitians (RDs) and other qualified personnel develop nutrition education curriculum for military treatment facilities, the DOD work site, and military food service occupational specialty curriculum using a variety of applicable modalities. RDs are trained and proficient in practical application of nutrition science to individual lifestyles and food choices and in techniques of nutrition education.

b. Other personnel (for example, health care providers, food service technicians, and military educators), when given appropriate training, may provide nutrition education. This will not include nutrition counseling, which is a component of medical nutrition therapy. (See para 2-1c.)

Appendix A

References

Section I

Required Publications

This section contains no entries.

Section II

Related Publications

AFI 34-239

Food Service Management Program

AFI 40-101

Health Promotion Program

AFI 40-104

Nutrition Education

AFI 40-502

The Weight Management Program

AFI 44-135

Clinical Dietetics

AFI 44-144

Nutritional Medicine Management

AFMAN 34-240

Food Service Program Management

AR 30-1

The Army Food Service Program

AR 40-3

Medical, Dental, and Veterinary Care

AR 600-9

The Army Weight Control Program

AR 600-63

Army Health Promotion

DOD 1338.10-M

Manual for the Department of Defense Food Service Program

DOD Directive 1010.10

Health Promotion

DOD Directive 3235.2

DOD Food and Nutrition Research, Development, Testing, Evaluation, and Engineering Program

DOD Instruction 1338.10

Department of Defense Food Service Program

Dietary Guidelines for Americans, 2000.

U.S. Department of Agriculture and U.S. Department of Health and Human Services. Washington, DC: U.S. Government Printing Office, 2000.* (Internet address: <http://www.health.gov/dietaryguidelines/>)

Dietary Reference Intakes for Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride.

Food and Nutrition Board, Institute of Medicine. Washington, DC: National Academy Press, 1997.**

Dietary Reference Intakes for Thiamin, Riboflavin, Niacin, Vitamin B6, Folate, Vitamin B12, Pantothenic Acid, Biotin, and Choline.

Food and Nutrition Board, Institute of Medicine. Washington, DC: National Academy Press, 2000.**

Dietary Reference Intakes for Vitamin C, Vitamin E, Selenium, and Carotenoids.

Food and Nutrition Board, Institute of Medicine. Washington, DC: National Academy Press, 2000.**

FM 21-10 (Army)

Field Hygiene and Sanitation

FM 10-23 (Army)

Basic Doctrine for Army Field Feeding and Class I Operations Management

The Food Guide Pyramid.

U.S. Department of Agriculture. Washington, DC: U.S. Government Printing Office, 1996.* (Home and Garden Bulletin No. 252)

Healthy People 2010: Understanding and Improving Health.

Office of Disease Prevention and Health Promotion, U.S. Department of Health and Human Services. Washington, DC: U.S. Government Printing Office, 2000.* (Stock Number 017-001-00543-6) (Internet address: www.health.gov/healthypeople/)

Improving America's Diet and Health: From Recommendations to Action.

Food and Nutrition Board, Institute of Medicine. Washington, DC: National Academy Press, 1991.**

MCO P10110.17

Marine Corps Nutrition and Menu Planning Manual

NATICK PAM 30-25, 4th Edition

Operational Rations of the Department of Defense. This publication is available from Commander, U.S. Army Soldier and Biological Chemical Command-Soldier System Center, ATTN: AMSSB-RCF(N), DOD Combat Feeding Program, Kansas Street, Natick, MA 01760-5000. (Internet address: http://www.sbccom.army.mil/hooah/pubs/OP_Rations.pdf.)

NAVMEDCOMINST 10110.2

Navy Medical Foods Service Program

NAVSUP P-486

Food Service Management for General Messes

OPNAVINST 6100.1 series

Nutrition and Weight Control

Recommended Dietary Allowances, 10th Edition.

Food and Nutrition Board, Institute of Medicine. Washington, DC: National Academy Press, 1989.**

* Available through:

Superintendent of Documents
U.S. Government Printing Office
P.O. Box 371954
Washington, D.C. 20402
(202)512-1800.

** Available through:

National Academy Press
2101 Constitution Ave., N.W.
Lockbox 285
Washington, D.C. 20055
website: www.nap.edu/

SECNAV Instruction 6100.5

Health Promotion Program

TB MED 507

Prevention, Treatment and Control of Heat Injury

USARIEM Technical Note TN-00/10

Military Dietary Recommended Intakes: Rationale for Tabled Values. This publication is available from Commander, U.S. Army Research Institute of Environmental Medicine, ATTN: MCMR-UE-NBD, Natick, MA 01760-5007.

USDA Nutrient Database for Standard Reference, US Department of Agriculture.

(Internet address: <http://www.nal.usda.gov/fnic/foodcomp>)

Section III

Prescribed Forms

This section contains no entries.

Section IV

Referenced Forms

This section contains no entries.

Glossary

Section I Abbreviations

cm
centimeters

d
day

DA
Department of the Army

DOD
Department of Defense

DRIs
Dietary Reference Intakes

FNB
Food and Nutrition Board

g
grams

GP-I
General Purpose, Improved

kcal
kilocalories

kg
kilogram

lb
pound

MDRIs
Military Dietary Reference Intakes

mEq
milliequivalents

mg
milligrams

µg
microgram

MRE
Meal, Ready to Eat

NSOR
Nutritional Standards for Operational Rations

RD
Registered Dietitian

RDAs
Recommended Dietary Allowances

TSG

The Surgeon General

UGR

Unitized Group Ration

USA

United States Army

USAF

United States Air Force

USARIEM

United States Army Research Institute of Environmental Medicine

USMC

United States Marine Corps

USN

United States Navy

Section II**Terms****Altitude sickness**

A symptom complex that sometimes occurs in individuals who ascend rapidly to high terrestrial altitude. Symptoms include severe headache, nausea, vomiting, anorexia and sleep disturbances.

Calorie

A unit of energy used to describe the amount of energy released by foods.

Cholesterol

A fat-like substance present in all animal foods. Dietary cholesterol, to a lesser extent than saturated fats, raises blood cholesterol levels in many individuals, increasing their risk for heart disease.

Dietary Reference Intakes

Nutrient values established by the Food and Nutrition Board of the Institute of Medicine, designed to reflect the latest understanding about nutrient requirements, which are based on optimizing health in individuals and groups.

Electrolytes

Compounds that partly dissociate in water to form ions. They maintain the fluid integrity of each compartment of the body.

Enhancements

Additional food components recommended, but not required, for use with operational rations to provide additional variety and alternate sources of nutrients. Because taste fatigue is common when consuming the same ration at each meal over several days, enhancements are recommended.

Gram (g)

A unit of measure for mass equal to 0.035 ounce.

Healthy foods

Foods known to promote health by their nutrient density. Examples include fresh and frozen fruits and vegetables, legumes, whole-grains, low-fat meats, and low-fat dairy products.

Kilocalorie (kcal)

Common unit used to describe energy needs. The term “calorie” is used in the text of this document in place of the term “kcal.”

Kilogram (kg)

A unit of measure for mass; is equal to 1,000 grams and 2.2 pounds.

Macronutrients

Carbohydrates, proteins, and fats. Essential to human health in relatively large amounts, when compared to the micronutrients (minerals and vitamins).

Medical nutrition therapy

The use of specific nutrition services (assessment of nutritional status, individualized diet modification and nutrition counseling, and specialized nutrition therapy) to treat an illness, injury, or medical condition.

Microgram (µg)

A unit of measure for mass; is equal to 1/1,000,000 gram.

Military Dietary Reference Intakes

Nutritional standards, based on the Food and Nutrition Board's Dietary Reference Intakes, and intended for use by professional personnel involved in menu development, menu evaluation, nutrition education, nutrition research, and food research and development.

Milliequivalent (mEq)

A unit of measure; 1/1,000 of an equivalent of a chemical element (for example, potassium).

Milligram (mg)

A unit of measure for mass; is equal to 1/1,000 gram.

Nutrition counseling

Assessment of the nutritional status of patients with a condition, illness or injury that appropriately requires medical nutrition therapy as part of the treatment. The assessment includes review and analysis of medical and diet history, blood chemistry lab values, and anthropometric measurements to determine nutritional status and treatment modalities. Therapy ranges from diet modification to administration of specialized nutrition therapies such as intravenous medical nutritional products as determined necessary to manage a condition or treat illness or injury.

Nutrition education

Learning situations designed to allow client(s) to learn more about food choices and eating habits that optimize health and performance. Effective nutrition education is based on the client's perceived education needs, is developmental (for example, builds on previous learning), and results in changed eating behaviors.

Operational ration

A nutritionally adequate ration composed of semi-perishable and/or shelf-stable pre-prepared food items for use under actual or simulated combat conditions. This ration includes the Meal, Ready-to-Eat (MRE), the B-ration, and Unitized Group Rations (A, B, or heat and serve).

Reference measures

Body heights and weights that represent the 50th percentile of military men and women for height and weight. Reference measures are used in this regulation to estimate energy needs, protein, and other nutrient standards that are computed on a per kilogram of body weight basis.

Restricted ration

A lightweight, operational ration requiring no food preparation other than rehydration. This ration is intended for short-range patrols when minimal ration weight and space requirements are overriding considerations. It provides suboptimal levels of energy (approximately 1500 calories) and nutrients, and is intended for only short periods of use.

Saturated fats

Fats found in large amounts in meat and dairy products, and in some vegetables such as coconut, palm, and palm kernel oils. Eating large amounts of saturated fats raises blood cholesterol levels in many individuals, increasing their risk for heart disease.

Supplements

The addition of foods to make an operational ration nutritionally complete. Bread and milk are required supplements to group operational rations.

Survival ration

A high-carbohydrate, low-protein ration, designed to minimize the effects of acute starvation. This ration is stored in life-saving craft aboard ships and in emergency kits aboard aircraft.

Section III**Special Abbreviations and Terms**

This section contains no entries.

Index

This index is organized alphabetically by topic and subtopic within a topic. Topics and subtopics are identified by paragraph number.

Abbreviations and terms, 1-3

Carbohydrate consumption, 2-4

Carbohydrate-electrolyte beverages, 2-5

Cold environments, 2-3

Dietary Reference Intakes, 2-1

DOD responsibility for nutrition standards and education, 1-4

Energy requirements, 2-1, 2-3

Enhancements, 2-2

Environmental factors, 2-3, 2-5

Fat consumption, 2-2, 2-4

Food and Nutrition Board, 2-1

Food Packet, Long Range Patrol Ration, 2-2

Food Packet, Survival, Abandon Ship Ration, 2-2

Food Packet, Survival, Aircraft/Life Raft Ration, 2-2

Food Packet, Survival, General Purpose, Improved, 2-2

Group feeding rations, 2-2

High-altitude requirements, 2-3, 2-5

Hot environments, 2-3, 2-5

Meal, Cold Weather, 2-2

Meal, Ready-to-Eat, 2-2

Military dietary reference intakes, 1-1, 2-1, 2-2, 2-3, 2-4

Nutrition education, 3-1

Nutrition education personnel, 3-1, 3-2

Nutrition programs, 1-4

Nutritional standards for operational rations, 2-2

Nutritional standards for restricted rations, 2-2

Operational rations, 1-1, 2-2

Protein consumption, 2-4

Recommended Dietary Allowances, 2-1

Reduced calorie menus, 2-6

Reference measures, 2-3

Registered Dietitian, 3-2

Responsibilities of

The Commander, Naval Supply Systems Command, USN, 1-4

The Deputy Chief of Staff for Installation and Logistics (DCSI&L), USMC, 1-4

The Deputy Chief of Staff for Logistics, USA, 1-4

The Director of Services, USAF, 1-4

The Surgeon General, USA, 1-4

The Surgeon General, USAF, 1-4

The Surgeon General, USN, 1-4

Restricted rations, 1-4, 2-2

Salt tablets, use of, 2-5

Sodium requirements, 2-5

Special nutritional needs, 2-1, 2-2, 2-3

U.S. Army Medical Research Materiel Command, 1-4

Water requirements, 2-5

Weight control programs, 1-4, 2-6

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